REMARKS

The drawings have been objected to. The drawings have been appropriately amended.

Claims 1-10 have been rejected under 35 U.S.C. § 102(b) as being anticipated by Chong et al. (U.S. Patent No. 5,699,613). It is respectfully submitted, however, that these claims are now patentable over Chong for the reasons set forth below.

Applicants' claimed invention, as recited by claim 1, includes a feature which is neither disclosed nor suggested by the art of record, namely:

> ... a plurality of inner conductive patterns alternating with a plurality of interstitial via holes ...

In particular, Chong neither discloses nor suggests conductive patterns alternating with interstitial via holes. In fact, Chong discloses only one via hole. Accordingly, claim 1 is patentable over Chong.

Claims 2-10 are patentable by virtue of the dependency on allowable claim 1.

Claims 4 and 6-10 have been rejected under 35 U.S.C. § 103(a) as being unpatentable over Chong. Again, these claims are patentable by virtue of their dependency on allowable claim 1.

Claims 11-17 have been rejected under 35 U.S.C. § 103(a) as being unpatentable over Chong in view of Yamamoto (U.S. Patent No. 5,736,681). This rejection is rendered moot by the cancellation of those claims.

Claims 18-34 have been rejected for the same reasons set forth with regards to claims 1-17. As claim 18 has been amended, however, these claims are also patentable for the reasons set forth above.

In view of the amendments and arguments set forth above, the above-identified application is in condition for allowance which action is respectfully requested.

Respectfully submitted,

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LEA/fp

Enclosures: Version With Markings To Show Changes Made
Replacement Figs. 1(a)-1(d), 2(a)-2(d), 3(a)-3(f)

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VERSION WITH MARKINGS TO SHOW CHANGES MADE

IN THE TITLE:

MULTILAYER PRINTED WIRING BOARD AND ITS MANUFACTURING METHOD

IN THE CLAIMS:

Claims 11-17, 24-26 and 30-35 have been cancelled.

1. (Amended) A multilayer printed wiring board comprising:

(a) ~~an inner layer material comprising~~

~~an insulating substrate,~~

a plurality of inner conductive patterns~~, each of said plurality of inner conductive patterns is formed of a metal foil disposed on both sides of said insulating substrate, respectively, and~~

~~an~~ alternating with a plurality of interstitial via holes~~s disposed on said insulating substrate~~;

(b) ~~an~~ respective insulating ~~resin disposed on both sides of said inner layer material, respectively~~layers, one of said insulating layers above a top one of said inner conductive patterns, another below a bottom one of said conductive patterns;

(c) ~~an~~ respective outer conductive patterns~~ adhered on said insulating resin~~ formed on respective outer surfaces of said insulating layers; and

(d) ~~a~~ respective surface ~~via~~ holes~~ to connect electrically between said inner conductive pattern and said outer conductive pattern,~~

~~wherein said interstitial via hole connects electrically between respective inner conductive pattern of said plurality of inner conductive patterns, and~~

~~said outer conductive pattern is formed of a metal foil of a metal foil with insulating resin, said metal foil with insulating resin comprising said insulating resin and said metal foil adhered to said insulating resin~~ formed in each of said insulating layers to expose said top one and bottom one of said inner conductive patterns, each of said surface holes filled with plating material in contact with said outer conductive patterns.

18. (Amended) A ~~manufacturing~~ method of manufacturing a multilayer printed wiring board, said method comprising the steps of:

(a) preparing an inner layer material,

said inner layer material comprising

~~an insulating substrate,~~

~~an~~ a plurality of inner conductive patterns ~~formed of a metal foil disposed on both sides of said insulating substrate, respectively, and~~

~~an~~ alternating with a plurality of interstitial via holes ~~disposed on said insulating substrate~~;

(b) ~~superimposing a metal foil with insulating resin on both surfaces of said inner layer material, respectively, said metal foil with insulating resin formed of an insulating resin and a metal foil adhered to said insulating resin;~~

~~(c) applying a pressing force to said inner layer material and said metal foil with insulating resin superimposed on each of both surfaces of said inner layer material while heat being applied thereto, thereby allowing said insulating resin to be attached by adhesion on said inner layer material;~~

~~(d) forming a non through hole on said metal foil with insulating resin by having said metal foil with insulating resin worked on;~~

~~(e) forming an outer conductive pattern by having said exposed metal foil worked on; and~~

~~(f) connecting electrically between said outer conductive pattern and said inner conductive pattern.~~providing respective insulating layers, one of said insulating layers above a top one of said inner conductive patterns, another below a bottom one of said conductive patterns;

(c) forming respective outer conductive patterns on respective outer surfaces of said insulating layers;

(d) forming respective surface holes in each of said insulating layers to expose said top one and bottom one of said inner conductive patterns, and

(e) filling said surface holes with plating material in contact with said outer conductive patterns.

19. (Amended) The manufacturing method of a multilayer printed wiring board according to Claim 18, wherein said inner layer material includes an insulating substrate,

~~wherein~~ a method for preparing said inner layer material comprises the steps of:

(i) forming a through hole in a sheet like resin prepreg comprising a base material and a resin impregnated to said base material,

(ii) filling a conductive paste in said through hole,

(iii) superimposing a metal foil on both sides of said resin prepreg having said conductive paste, respectively,

(iv) applying a pressing force to said resin prepreg having said conductive paste with said metal foil superimposed thereon while heat being applied thereto,

thereby forming said insulating substrate as a result of hardening of said resin prepreg,

joining said insulating substrate and said metal foil together by adhesion and

forming said interstitial via hole as a result of hardening of said conductive paste, and

(v) forming said inner conductive pattern by having said metal foil worked on.

20. (Amended) The manufacturing method of a multilayer printed wiring board according to Claim 19,

wherein said through hole and said ~~non-through~~surface holes are formed by laser beam machining.

21. (Amended) The manufacturing method of a multilayer printed wiring board according to Claim 19,

wherein said step of forming said ~~non-through~~surface holes comprises the step of:

eliminating ~~in advance said~~ metal foil located on an area where said non-through hole is to be formed; and

forming said non-through hole at a position where said metal foil is eliminated.

22. (Amended) The manufacturing method of a multilayer printed wiring board according to Claim 18,

wherein said step of connecting electrically between said outer conductive patterns and said inner conductive patterns includes a step of applying a metal plating to said non-through hole.

23. (Amended) The manufacturing method of a multilayer printed wiring board according to Claim 18,

wherein said step of forming ~~a non-through~~surface holes on said metal foil with insulating resin further comprises the steps of:

eliminating ~~said~~ metal foil in an area where said non-through hole is formed; and

forming said ~~non-through~~surface holes by irradiating a laser beam having a diameter larger than a diameter required of said non-through hole in said area where said metal foil is eliminated.

27. (Amended) The manufacturing method of a multilayer printed wiring board according to Claim 18,

~~wherein said~~ further comprising step of connecting electrically between said outer conductive pattern and said inner conductive pattern, said step further comprises the steps of:

applying a metal plating to said ~~non-through~~surface holes; and

applying ~~a~~ metal plating on a surface of said outer conductive patterns.

28. (Amended) The manufacturing method of a multilayer printed wiring board according to Claim 19,

wherein at least one of said ~~non-through~~surface holes and said through holes ranges from about 30 μm to about 100 μm in diameter.

29. (Amended) The manufacturing method of a multilayer printed wiring board according to Claim 18,

wherein said step of forming said inner layer material includes a step of forming a plurality of insulating substrates and a plurality of ~~i8nner~~ inner conductive patterns, each of plurality of inner conductive patterns is disposed, respectively, on both sides of said each respective insulating substrate.

Fig. 1

Fig. 1(a)

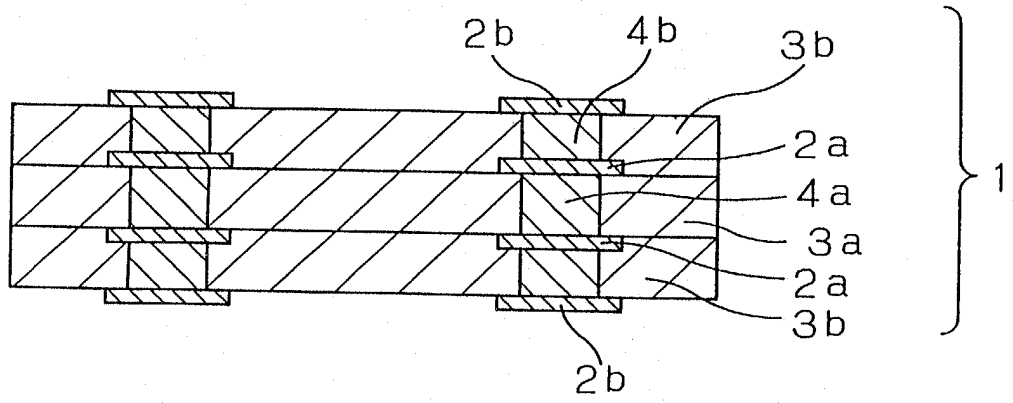

Fig. 1(b)

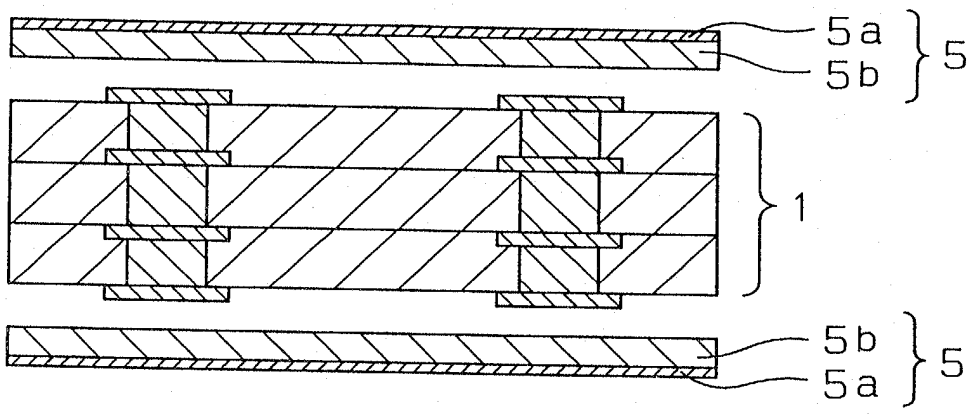

Fig. 1(c)

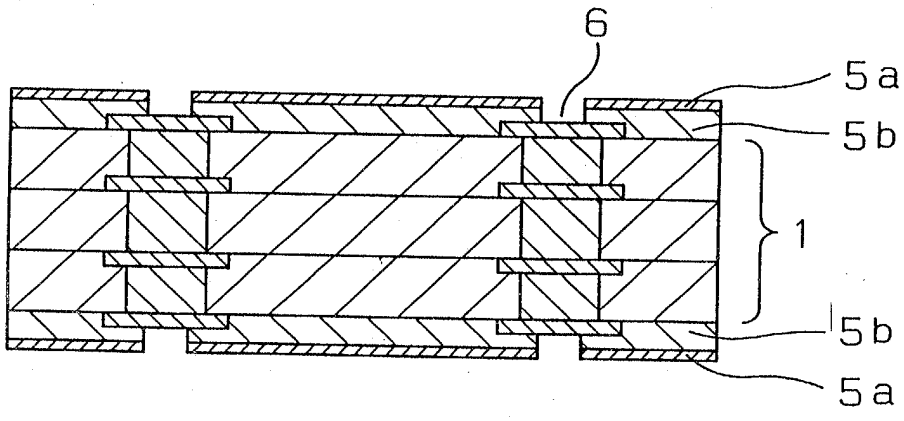

Fig. 1(d)

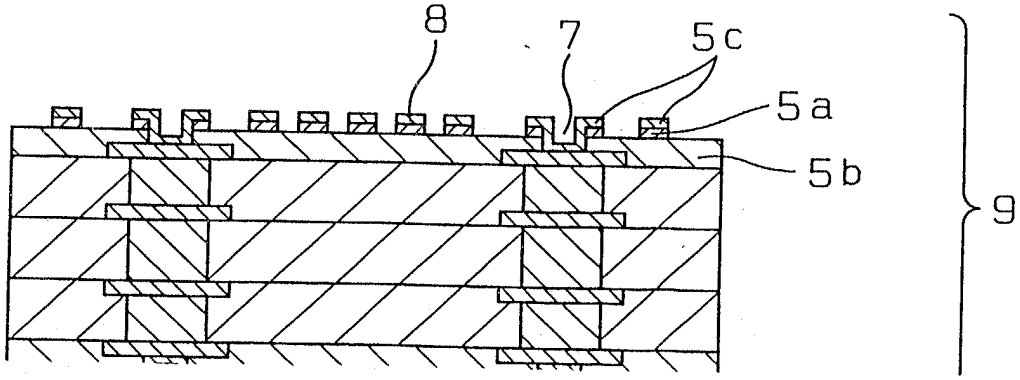

Fig. 2

Fig. 2(a)

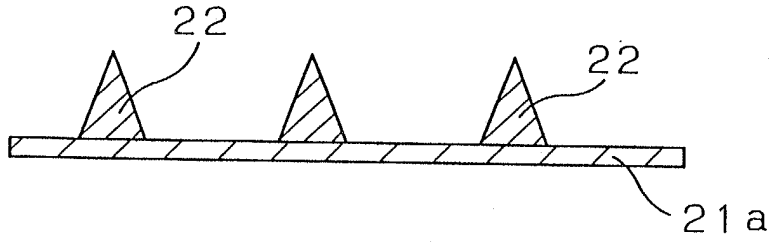

Fig. 2(b)

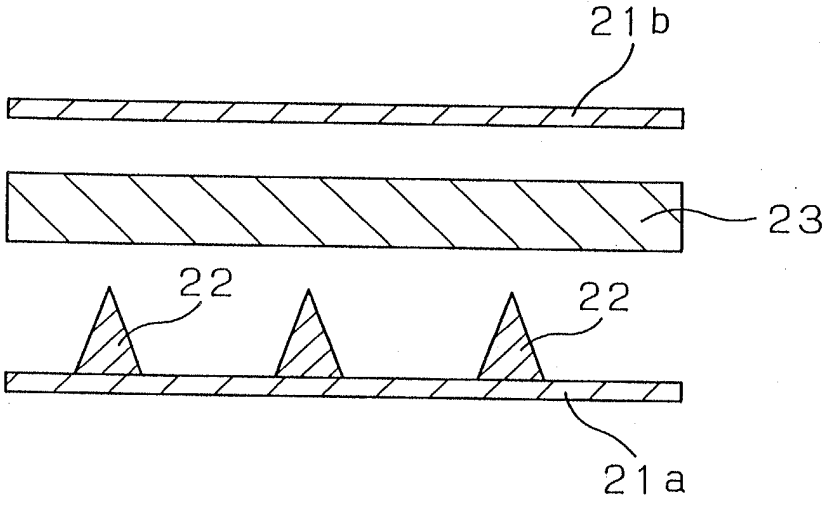

Fig. 2(c)

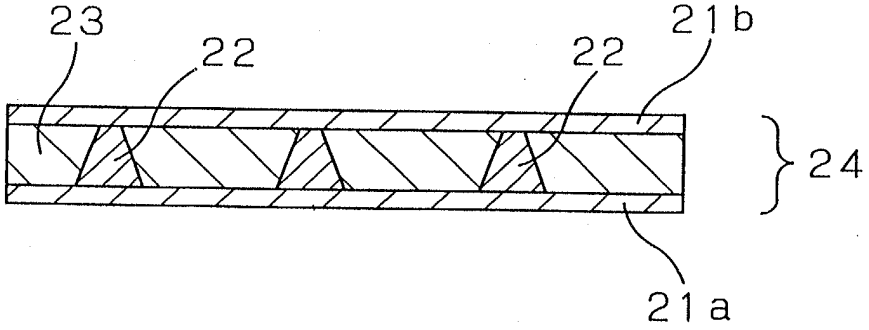

Fig. 2(d)

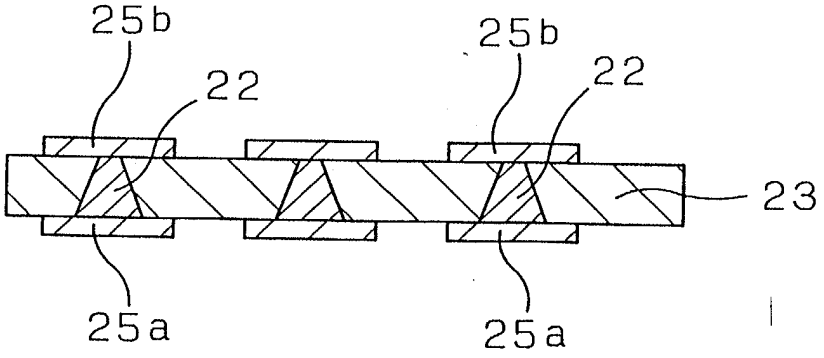

Fig. 3

Fig. 3(a)

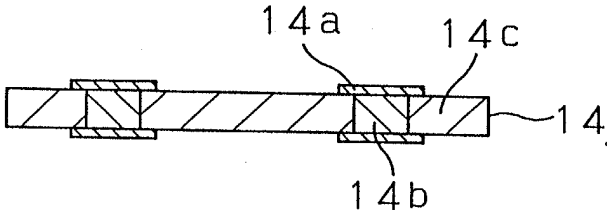

Fig. 3(b)

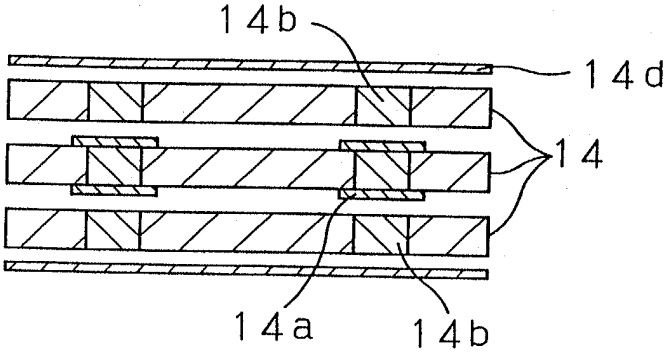

Fig. 3(c)

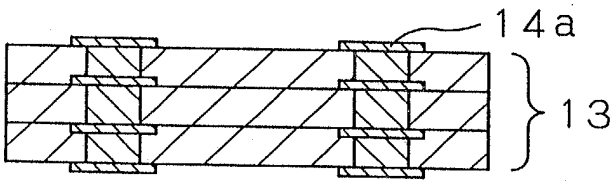

Fig. 3(d)

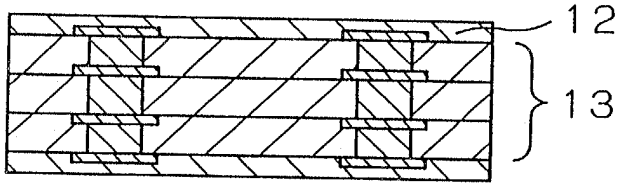

Fig. 3(e)

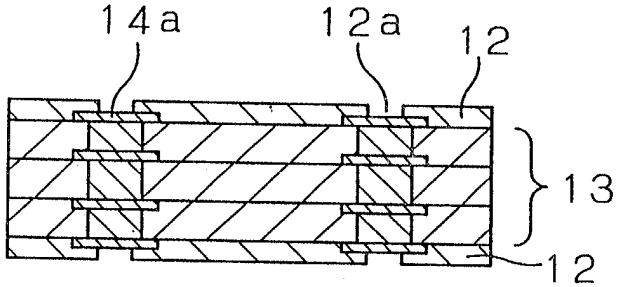

Fig. 3(f)